9.0 Bains Gap Road – Range 21, Parcel 77(Q)

9.1 Site Description

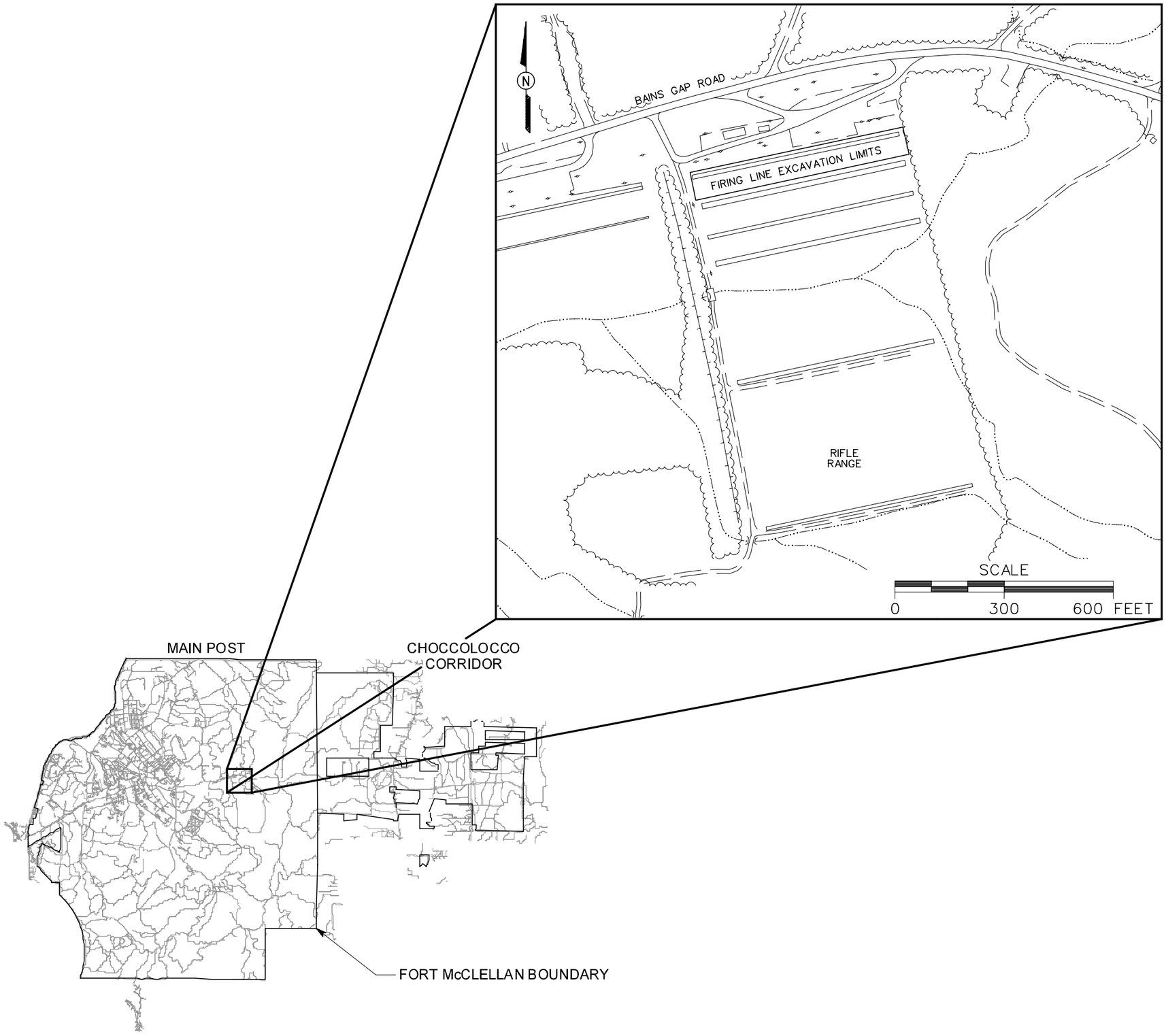
Range 21, Parcel 77(Q), the Field Fire Range, was in use from 1951 until installation closure in 1999. Historically, ordnance fired at the range consisted of M-16 rifles (5.56-mm) with tracer rounds. Unspecified small arms were used at this range prior to the advent of the M-16. This range is located within the impact area of the World War I Artillery Impact Area.

Target lines at 75 meters, 175 meters, and 300 meters (from the firing line) contained a series of electrified concrete target coffins that were used to store and present pop-up targets during training exercises. The area between Cane Creek and the 175-meter target line is eroded and bullet fragments have been observed on the surface. This range is separated from Range 22 on the west by an unimproved road and a substantial soil berm. Cane Creek flows across the center of the range, west towards Range 22 through the dividing soil berm via a concrete culvert. Refer to Figure 9-1 for the Range 21, Parcel 77(Q) location.

Because of the hilly terrain of this range, contamination is not expected to be found within the range fan; however, XRF samples will be collected at strategic locations within the range fan to address the potential for lead contamination.

9.2 Sample Locations and Rationale

The sampling locations and rationale are listed in Table 9-1. Proposed sampling locations are shown in Figure 9-2. Surface soil sample designations and QA/QC sample requirements are summarized in Table 9-2. Groundwater sample designations and QA/QC sample requirements are summarized in Table 9-3. The samples will be analyzed using EPA SW-846 methods, including Update III Methods where applicable, as presented in Table 9-4 of this SFSP and Table 6-1 in the QAP. The final sampling locations will be determined in the field by the on-site geologist, based on actual field conditions. Refer to Section 13.0 of this SFSP for a detailed discussion of the range sampling.



LEGEND

- UNIMPROVED ROADS AND PARKING
- PAVED ROADS AND PARKING
- BUILDING
- TREES / TREELINE
- BRIDGE
- CULVERT WITH HEADWALL
- SURFACE DRAINAGE / CREEK
- MANMADE SURFACE DRAINAGE FEATURE
- BERM
- UTILITY POLE

FIGURE 9-1
SITE LOCATION MAP
RANGE 21
PARCEL 77(Q)

U. S. ARMY CORPS OF ENGINEERS
MOBILE DISTRICT
FORT McCLELLAN
CALHOUN COUNTY, ALABAMA
Contract No. DACA21-96-D-0018

IT CORPORATION
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DRAFT. CHCK. BY:
ENGR. CHCK. BY: S. MORAN
INITIATOR: J. BOND
PROJ. MGR.: J. YACOUB
DWG. NO.: ...\800486es.017
PROJ. NO.: 800486

DATE LAST REV.:
DRAWN BY:
STARTING DATE: 07/03/01
DRAWN BY: D. BOMAR

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Table 9-1

Sampling Locations and Rationale
Range Sampling
Bains Gap Road
Range 21, Parcel 77(Q)
Fort McClellan, Calhoun County, Alabama

Sample Location	Sample Media	Sample Location Rationale
HR-77Q-MW01	Groundwater	Residuum monitoring well to be installed in the central portion of Range 21, adjacent to proposed bedrock monitoring well HR-77Q-MW02. The completed depth of the well is anticipated to be approximately 45 feet below ground surface (bgs). Sample data will indicate if contaminant releases into the environment have occurred from the use of this area and if contaminated media exist at this site. The monitoring well location will be used to establish a local groundwater flow direction, characterize site-specific geology, and provide information on groundwater quality in the residuum aquifer.
HR-77Q-MW02	Groundwater	Bedrock monitoring well to be installed in the central portion of Range 21, adjacent to proposed residuum monitoring well HR-77Q-MW01. The completed depth of the well is anticipated to be approximately 100 feet bgs. Sample data will indicate if contaminant releases into the environment have occurred from the use of this area and if contaminated media exist at this site. The monitoring well location will be used to establish a vertical hydraulic gradient, characterize site-specific geology, and provide information on groundwater quality in the bedrock aquifer.
HR-77Q-MW03	Groundwater	Residuum monitoring well to be installed on the northern end of Range 21. The completed depth of the well is anticipated to be approximately 45 feet bgs. Sample data will indicate if contaminant releases into the environment have occurred from the use of this area and if contaminated media exist at this site. The monitoring well location will be used to establish a local groundwater flow direction, characterize site-specific geology, and provide information on groundwater quality in the residuum aquifer.
HR-77Q-MW04	Groundwater	Residuum monitoring well to be installed on the southern end of Range 21. The completed depth of the well is anticipated to be approximately 45 feet bgs. Sample data will indicate if contaminant releases into the environment have occurred from the use of this area and if contaminated media exist at this site. The monitoring well location will be used to establish a local groundwater flow direction, characterize site-specific geology, and provide information on groundwater quality in the residuum aquifer.
HR-77Q-SS01	Surface soil	Surface soil sample location to be collected near the Engineering Evaluation/Cost Analysis soil sample location (SS24) where a high concentration of lead was detected. Surface soil sample will be analyzed for a complete set of parameters to determine if Range 21 has been impacted with any additional contaminants (there is known lead contamination). Soil sample data will also be used to assess potential impacts to terrestrial biota that might utilize the site for food and/or habitat.

DWG. NO.: ...\800486es.018 | PROJ. NO.: 800486
INITIATOR: J. BOND | PROJ. MGR.: J. YACOUB
DRAFT. CHCK. BY: | ENGR. CHCK. BY: S. MORAN
REV.: | DATE LAST REV.: | STARTING DATE: 07/03/01 | DRAWN BY: | DRAWN BY: D. BOMAR
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N

E 679,600

E 681,500

N 1,170,100

N 1,168,500

BAINS GAP ROAD

FIRING LINE EXCAVATION LIMITS

CONCRETE SLABS

CANE CREEK

RIFLE RANGE

HR-77Q-SS01

HR-77Q-MW01

HR-77Q-MW02

HR-77Q-MW03

HR-77Q-MW04

1000 975 950 925 900 1025

SCALE

0 200 400 FEET

LEGEND

- UNIMPROVED ROADS AND PARKING
- PAVED ROADS AND PARKING
- BUILDING
- TOPOGRAPHIC CONTOURS (CONTOUR INTERVAL - 5 FOOT)
- TREES / TREELINE
- BRIDGE
- CULVERT WITH HEADWALL
- SURFACE DRAINAGE / CREEK
- MANMADE SURFACE DRAINAGE FEATURE
- BERM
- UTILITY POLE
- PROPOSED BEDROCK MONITORING WELL LOCATION
- PROPOSED RESIDUUM MONITORING WELL LOCATION
- PROPOSED SURFACE SOIL SAMPLE LOCATION

FIGURE 9-2
PROPOSED SAMPLE LOCATION MAP
RANGE 21
PARCEL 77(Q)

U. S. ARMY CORPS OF ENGINEERS
MOBILE DISTRICT
FORT McCLELLAN
CALHOUN COUNTY, ALABAMA
Contract No. DACA21-96-D-0018

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Table 9-2

Surface Soil Sample Designations and QA/QC Sample Quantities
Range Sampling
Bains Gap Road
Range 21
Parcel 77(Q)
Fort McClellan, Calhoun County, Alabama

Sample Location	Sample Designation	Sample Depth (ft)	QA/QC Samples			Analytical Suite
			Field Duplicates	Field Splits	MS/MSD	
HR-77Q-SS01	HR-77Q-SS01-SS-HPP0001-REG	0-1	HR-77Q-SS01-SS-HPP0002-FD		HR-77Q-SS01-SS-HPP0001-MS/MSD	TCL VOCs, TCL SVOCs, TAL Metals, Nitroexplosives, Perchlorate, Cyanide, OP & Cl Pest., Herbicides, and PCBs

Cl Pest. - Chlorinated Pesticides.
FD - Field duplicate.
MS/MSD - Matrix spike/matrix spike duplicate.
OP Pest. - Organophosphorous Pesticide.
PCB - Polychlorinated biphenyl.
QA/QC - Quality assurance/quality control.
REG - Field sample.
SVOC - Semivolatile organic compound.
TAL - Target analyte list.
TCL - Target compound list.
VOC - Volatile organic compound.

Table 9-3

Groundwater Sample Designations and QA/QC Sample Quantities
Range Sampling
Bains Gap Road
Range 21
Parcel 77(Q)
Fort McClellan, Calhoun County, Alabama

Sample Location	Sample Designation	Sample Matrix	QA/QC Samples			Analytical Suite
			Field Duplicates	Field Splits	MS/MSD	
HR-77Q-MW01	HR-77Q-MW01-GW-HPP3001-REG	Groundwater			HR-77Q-MW01-GW-HPP3001-MS/MSD	TCL VOCs, TCL SVOCs, TAL Metals, Nitroexplosives, and Perchlorate
HR-77Q-MW02	HR-77Q-MW02-GW-HPP3002-REG	Groundwater	HR-77Q-MW02-GW-HPP3003-FD			TCL VOCs, TCL SVOCs, TAL Metals, Nitroexplosives, and Perchlorate
HR-77Q-MW03	HR-77Q-MW03-GW-HPP3004-REG	Groundwater				TCL VOCs, TCL SVOCs, TAL Metals, Nitroexplosives, and Perchlorate
HR-77Q-MW04	HR-77Q-MW04-GW-HPP3005-REG	Groundwater				TCL VOCs, TCL SVOCs, TAL Metals, Nitroexplosives, and Perchlorate

FD - Field duplicate.
MS/MSD - Matrix spike/matrix spike duplicate.
QA/QC - Quality assurance/quality control.
REG - Field sample.
SVOC - Semivolatile organic compound.
TAL - Target analyte list.
TCL - Target compound list.
VOC - Volatile organic compound.

Table 9-4

Analytical Samples
Range Sampling
Bains Gap Road
Range 21
Parcel 77(Q)
Fort McClellan, Calhoun County, Alabama

Parameters	Analysis Method	Sample Matrix	TAT Needed	Field Samples: No. of Sample Points	Field Samples: No. of Events	Field Samples: No. of Field Samples	QA/QC Samples[a]: Field Dups (10%)	QA/QC Samples[a]: Splits w/ QA Lab (0%)	QA/QC Samples[a]: MS/MSD (5%)	QA/QC Samples[a]: Trip Blank (1/ship)	QA/QC Samples[a]: Eq. Rinse (1/wk/matrix)	EMAX Total No. Analysis	QA Lab Total No. Analysis
Bains Gap Road - Range 21, Parcel 77(Q): 4 water matrix samples (4 groundwater samples) and **1 soil matrix sample** (1 surface soil)													
TCL VOCs	8260B	water	normal	4	1	4	1		1	1	1	9	0
TCL SVOCs	8270C	water	normal	4	1	4	1		1	1	1	9	0
TAL Metals	6010B/7000	water	normal	4	1	4	1		1	1	1	9	0
Nitroexplosives	8330	water	normal	4	1	4	1		1	1	1	9	0
Perchlorate	314	water	normal	4	1	4	1		1	1	1	9	0
TCL VOCs	8260B/5035	soil	normal	1	1	1	1		1		1	5	0
TCL SVOCs	8270C	soil	normal	1	1	1	1		1		1	5	0
TAL Metals	6010B/7000	soil	normal	1	1	1	1		1		1	5	0
Nitroexplosives	8330	soil	normal	1	1	1	1		1		1	5	0
Cyanide	9012B	soil	normal	1	1	1	1		1		1	5	0
OP Pesticides	8141A	soil	normal	1	1	1	1		1		1	5	0
Cl Pesticides	8081A	soil	normal	1	1	1	1		1		1	5	0
Herbicides	8151A	soil	normal	1	1	1	1		1		1	5	0
Perchlorate	314	soil	normal	1	1	1	1		1		1	5	0
PCBs	8082	soil	normal	1	1	1	1		1		1	5	0
Range 21 Subtotal:				24	9	0	9		5	9		65	0

[a]Field duplicate and MS/MSD samples were calculated as a percentage of the field samples collected per site and were rounded to the nearest whole number.
Trip blank samples will be collected in association with water matrix samples for VOC analysis only. Assumed four field samples per day to estimate trip blanks. Equipment blanks will be collected once per event whenever sampling equipment is field decontaminated and re-used. They will be repeated weekly for sampling events that are anticipated to last more than 1 week. Assumed 20 field samples will be collected per week to estimate number of equipment blanks.

Ship samples to: EMAX Laboratories, Inc
1835 205th Street
Torrance, CA 90501
Attn: Elizabeth McIntyre
Tel: 310-618-8889
Fax: 310-618-0818

ASTM - American Society for Testing and Materials.
Cl Pesticides - Chlorinated Pesticides.
Dups - Duplicates.
Eq. Rinse - Equipment rinse.
MS/MSD - Matrix spike/matrix spike duplicate.
OP Pesticides - Organophosphorous Pesticides.
PCB - Polychlorinated Biphenyl.
QA/QC - Quality assurance/quality control.
SVOC - Semivolatile organic compound.
TAL - Target analyte list.
TCL - Target compound list.
VOC - Volatile organic compound.

10.0 Bains Gap Road – Range 22, Parcel 78(Q)

10.1 Site Description

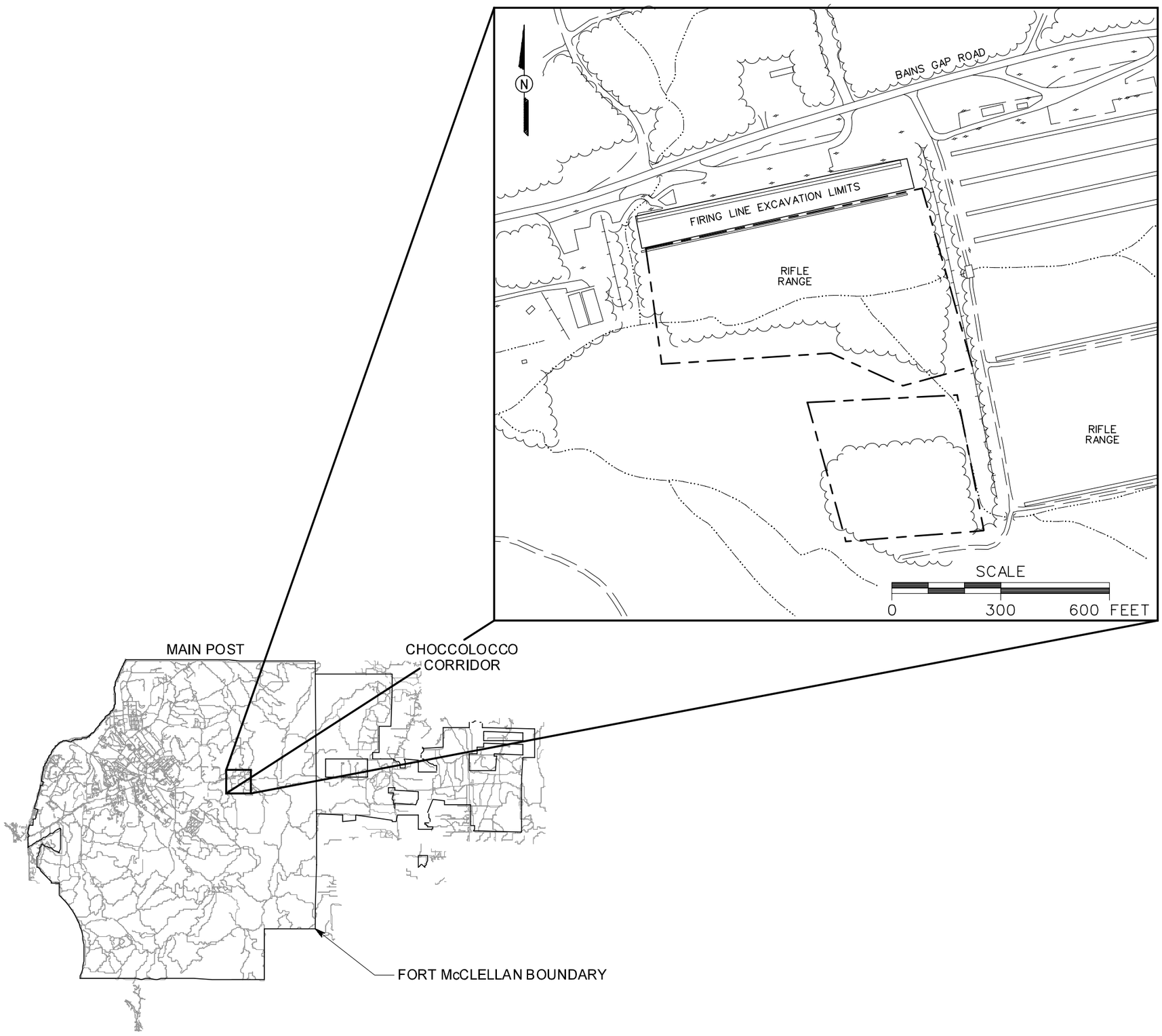
Range 22, Parcel 78(Q), the Zero Fire Range, was in use from 1961 until installation closure in 1999. Historically, ordnance fired at the range consisted of M-16 rifles (5.56-mm) with tracer rounds. This range is located within the impact area of the World War I Artillery Impact Area.

Range 22 contains a rocky soil berm that forms the main impact zone for the majority of the site. Cane Creek flows along the entire length of the berm. On the eastern portion of the range, the berm height is much reduced and bullets have impacted the wooded area beyond. To the west of this range, a large soil berm separates Range 22 from Range 27. Cane Creek flows west behind this berm. There are bullets and bullet fragments in the creek bed and along the creek banks. Refer to Figure 10-1 for the Range 22, Parcel 78(Q) location.

Because of the hilly terrain of this range, contamination is not expected to be found within the range fan; however, XRF samples will be collected at strategic locations within the range fan to address the potential for lead contamination.

10.2 Sample Locations and Rationale

The sampling locations and rationale are listed in Table 10-1. Proposed sampling locations are shown in Figure 10-2. Surface soil sample designations and QA/QC sample requirements are summarized in Table 10-2. Groundwater sample designations and QA/QC sample requirements are summarized in Table 10-3. The samples will be analyzed using EPA SW-846 methods, including Update III Methods where applicable, as presented in Table 10-4 of this SFSP and Table 6-1 in the QAP. The final sampling locations will be determined in the field by the on-site geologist, based on actual field conditions. Refer to Section 13.0 of this SFSP for a detailed discussion of the range sampling.



LEGEND

- UNIMPROVED ROADS AND PARKING
- PAVED ROADS AND PARKING
- BUILDING
- TREES / TREELINE
- IMPACT ZONE
- BRIDGE
- CULVERT WITH HEADWALL
- SURFACE DRAINAGE / CREEK
- MANMADE SURFACE DRAINAGE FEATURE
- BERM
- UTILITY POLE

FIGURE 10-1
SITE LOCATION MAP
RANGE 22
PARCEL 78(Q)

U. S. ARMY CORPS OF ENGINEERS
MOBILE DISTRICT
FORT McCLELLAN
CALHOUN COUNTY, ALABAMA
Contract No. DACA21-96-D-0018

IT CORPORATION
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DRAWN BY: D. BOMAR DRAWN BY:
PROJ. MGR.: J. YACOUB DRAFT. CHCK. BY:
ENGR. CHCK. BY: S. MORAN
INITIATOR: J. BOND
PROJ. NO.: 800486 DWG. NO.: ...\800486es.020

Table 10-1

Sampling Locations and Rationale
Range Sampling
Bains Gap Road
Range 22, Parcel 78(Q)
Fort McClellan, Calhoun County, Alabama

Sample Location	Sample Media	Sample Location Rationale
HR-78Q-MW01	Groundwater	Residuum monitoring well to be installed in the central portion of Range 22, adjacent to proposed bedrock monitoring well HR-78Q-MW02. The completed depth of the well is anticipated to be approximately 45 feet below ground surface (bgs). Sample data will indicate if contaminant releases into the environment have occurred from the use of this area and if contaminated media exist at this site. The monitoring well location will be used to establish a local groundwater flow direction, characterize site-specific geology, and provide information on groundwater quality in the residuum aquifer.
HR-78Q-MW02	Groundwater	Bedrock monitoring well to be installed in the central portion of Range 22, adjacent to proposed residuum monitoring well HR-78Q-MW01. The completed depth of the well is anticipated to be approximately 100 feet bgs. Sample data will indicate if contaminant releases into the environment have occurred from the use of this area and if contaminated media exist at this site. The monitoring well location will be used to establish a vertical hydraulic gradient, characterize site-specific geology, and provide information on groundwater quality in the bedrock aquifer.
HR-78Q-MW03	Groundwater	Residuum monitoring well to be installed on the western end of Range 22. The completed depth of the well is anticipated to be approximately 45 feet bgs. Sample data will indicate if contaminant releases into the environment have occurred from the use of this area and if contaminated media exist at this site. The monitoring well location will be used to establish a local groundwater flow direction, characterize site-specific geology, and provide information on groundwater quality in the residuum aquifer.
HR-78Q-SS01	Surface soil	Surface soil sample location to be collected near the Engineering Evaluation/Cost Analysis soil sample location (SS21) where a high concentration of lead was detected. Surface soil sample will be analyzed for a complete set of parameters to determine if Range 22 has been impacted with any additional contaminants (there is known lead contamination). Soil sample data will also be used to assess potential impacts to terrestrial biota that might utilize the site for food and/or habitat.

DWG. NO.: ...\800486es.021 | PROJ. NO.: 800486
INITIATOR: J. BOND | PROJ. MGR.: J. YACOUB
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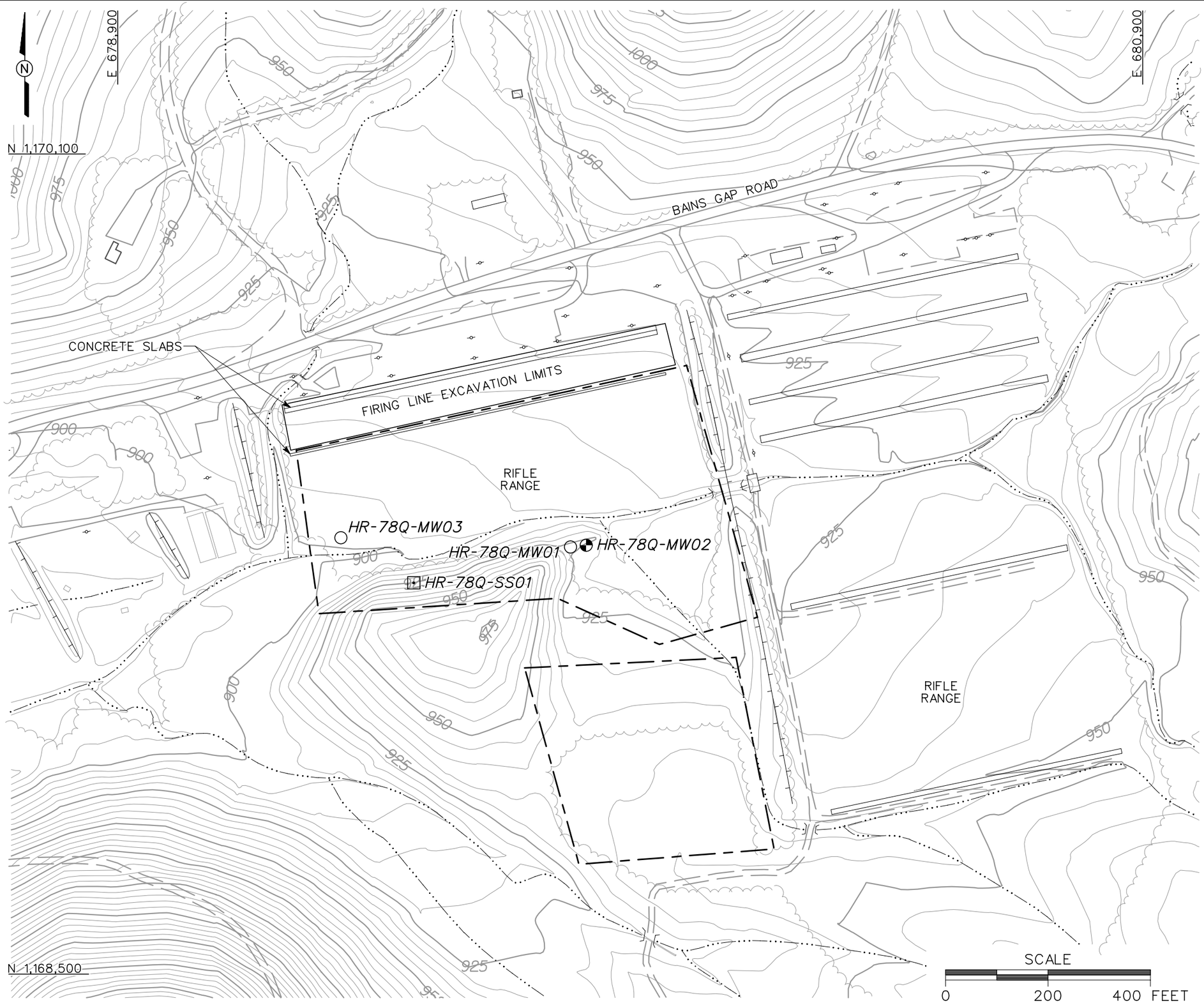

LEGEND

- UNIMPROVED ROADS AND PARKING
- PAVED ROADS AND PARKING
- BUILDING
- TOPOGRAPHIC CONTOURS (CONTOUR INTERVAL - 5 FOOT)
- TREES / TREELINE
- IMPACT ZONE
- BRIDGE
- CULVERT WITH HEADWALL
- SURFACE DRAINAGE / CREEK
- MANMADE SURFACE DRAINAGE FEATURE
- BERM
- UTILITY POLE
- PROPOSED BEDROCK MONITORING WELL LOCATION
- PROPOSED RESIDUUM MONITORING WELL LOCATION
- PROPOSED SURFACE SOIL SAMPLE LOCATION

FIGURE 10-2
SITE MAP
RANGE 22
PARCEL 78(Q)

U. S. ARMY CORPS OF ENGINEERS
MOBILE DISTRICT
FORT McCLELLAN
CALHOUN COUNTY, ALABAMA
Contract No. DACA21-96-D-0018

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Table 10-2

Surface Soil Sample Designations and QA/QC Sample Quantities
Range Sampling
Bains Gap Road
Range 22
Parcel 78(Q)
Fort McClellan, Calhoun County, Alabama

Sample Location	Sample Designation	Sample Depth (ft)	QA/QC Samples			Analytical Suite
			Field Duplicates	Field Splits	MS/MSD	
HR-78Q-SS01	HR-78Q-SS01-SS-HQQ0001-REG	0-1	HR-78Q-SS01-SS-HQQ0002-FD		HR-78Q-SS01-SS-HQQ0001-MS/MSD	TCL VOCs, TCL SVOCs, TAL Metals, Nitroexplosives, Perchlorate, Cyanide, OP & Cl Pest., Herbicides, and PCBs

Cl Pest. - Chlorinated Pesticides.
FD - Field duplicate.
MS/MSD - Matrix spike/matrix spike duplicate.
OP Pest. - Organophosphorous Pesticide.
PCB - Polychlorinated biphenyl.
QA/QC - Quality assurance/quality control.
REG - Field sample.
SVOC - Semivolatile organic compound.
TAL - Target analyte list.
TCL - Target compound list.
VOC - Volatile organic compound.

Table 10-3

Groundwater Sample Designations and QA/QC Sample Quantities
Range Sampling
Bains Gap Road
Range 22
Parcel 78(Q)
Fort McClellan, Calhoun County, Alabama

Sample Location	Sample Designation	Sample Matrix	QA/QC Samples			Analytical Suite
			Field Duplicates	Field Splits	MS/MSD	
HR-78Q-MW01	HR-78Q-MW01-GW-HQQ3001-REG	Groundwater			HR-78Q-MW01-GW-HQQ3001-MS/MSD	TCL VOCs, TCL SVOCs, TAL Metals, Nitroexplosives, and Perchlorate
HR-78Q-MW02	HR-78Q-MW02-GW-HQQ3002-REG	Groundwater	HR-78Q-MW02-GW-HQQ3003-FD			TCL VOCs, TCL SVOCs, TAL Metals, Nitroexplosives, and Perchlorate
HR-78Q-MW03	HR-78Q-MW03-GW-HQQ3004-REG	Groundwater				TCL VOCs, TCL SVOCs, TAL Metals, Nitroexplosives, and Perchlorate
HR-78Q-MW04	HR-78Q-MW04-GW-HQQ3005-REG	Groundwater				TCL VOCs, TCL SVOCs, TAL Metals, Nitroexplosives, and Perchlorate

w
MS/MSD - Matrix spike/matrix spike duplicate.
QA/QC - Quality assurance/quality control.
REG - Field sample.
SVOC - Semivolatile organic compound.
TAL - Target analyte list.
TCL - Target compound list.
VOC - Volatile organic compound.

Table 10-4

Analytical Samples
Range Sampling
Bains Gap Road
Range 22
Parcel 78(Q)
Fort McClellan, Calhoun County, Alabama

Parameters	Analysis Method	Sample Matrix	TAT Needed	Field Samples: No. of Sample Points	Field Samples: No. of Events	Field Samples: No. of Field Samples	QA/QC Samples[a]: Field Dups (10%)	QA/QC Samples[a]: Splits w/ QA Lab (0%)	QA/QC Samples[a]: MS/MSD (5%)	QA/QC Samples[a]: Trip Blank (1/ship)	QA/QC Samples[a]: Eq. Rinse (1/wk/matrix)	EMAX Total No. Analysis	QA Lab Total No. Analysis
Bains Gap Road - Range 22, Parcel 78(Q): 4 water matrix samples (4 groundwater samples) and **1 soil matrix sample** (1 surface soil)													
TCL VOCs	8260B	water	normal	4	1	4	1		1	1	1	9	0
TCL SVOCs	8270C	water	normal	4	1	4	1		1	1	1	9	0
TAL Metals	6010B/7000	water	normal	4	1	4	1		1	1	1	9	0
Nitroexplosives	8330	water	normal	4	1	4	1		1	1	1	9	0
Perchlorate	314	water	normal	4	1	4	1		1	1	1	9	0
TCL VOCs	8260B/5035	soil	normal	1	1	1	1		1		1	5	0
TCL SVOCs	8270C	soil	normal	1	1	1	1		1		1	5	0
TAL Metals	6010B/7000	soil	normal	1	1	1	1		1		1	5	0
Nitroexplosives	8330	soil	normal	1	1	1	1		1		1	5	0
Cyanide	9012B	soil	normal	1	1	1	1		1		1	5	0
OP Pesticides	8141A	soil	normal	1	1	1	1		1		1	5	0
Cl Pesticides	8081A	soil	normal	1	1	1	1		1		1	5	0
Herbicides	8151A	soil	normal	1	1	1	1		1		1	5	0
Perchlorate	314	soil	normal	1	1	1	1		1		1	5	0
PCBs	8082	soil	normal	1	1	1	1		1		1	5	0
			Range 22 Subtotal:	24	9	0	9		5	9		65	0

[a]Field duplicate and MS/MSD samples were calculated as a percentage of the field samples collected per site and were rounded to the nearest whole number.
Trip blank samples will be collected in association with water matrix samples for VOC analysis only. Assumed four field samples per day to estimate trip blanks. Equipment blanks will be collected once per event whenever sampling equipment is field decontaminated and re-used. They will be repeated weekly for sampling events that are anticipated to last more than 1 week. Assumed 20 field samples will be collected per week to estimate number of equipment blanks.

Ship samples to: EMAX Laboratories, Inc
1835 205th Street
Torrance, CA 90501
Attn: Elizabeth McIntyre
Tel: 310-618-8889
Fax: 310-618-0818

ASTM - American Society for Testing and Materials.
Cl Pesticides - Chlorinated Pesticides.
Dups - Duplicates.
Eq. Rinse - Equipment rinse.
MS/MSD - Matrix spike/matrix spike duplicate.
OP Pesticides - Organophosphorous Pesticides.
PCB - Polychlorinated Biphenyl.
QA/QC - Quality assurance/quality control.
SVOC - Semivolatile organic compound.
TAL - Target analyte list.
TCL - Target compound list.
VOC - Volatile organic compound.

11.0 Bains Gap Road – Range 27, Parcel 85(Q)

11.1 Site Description

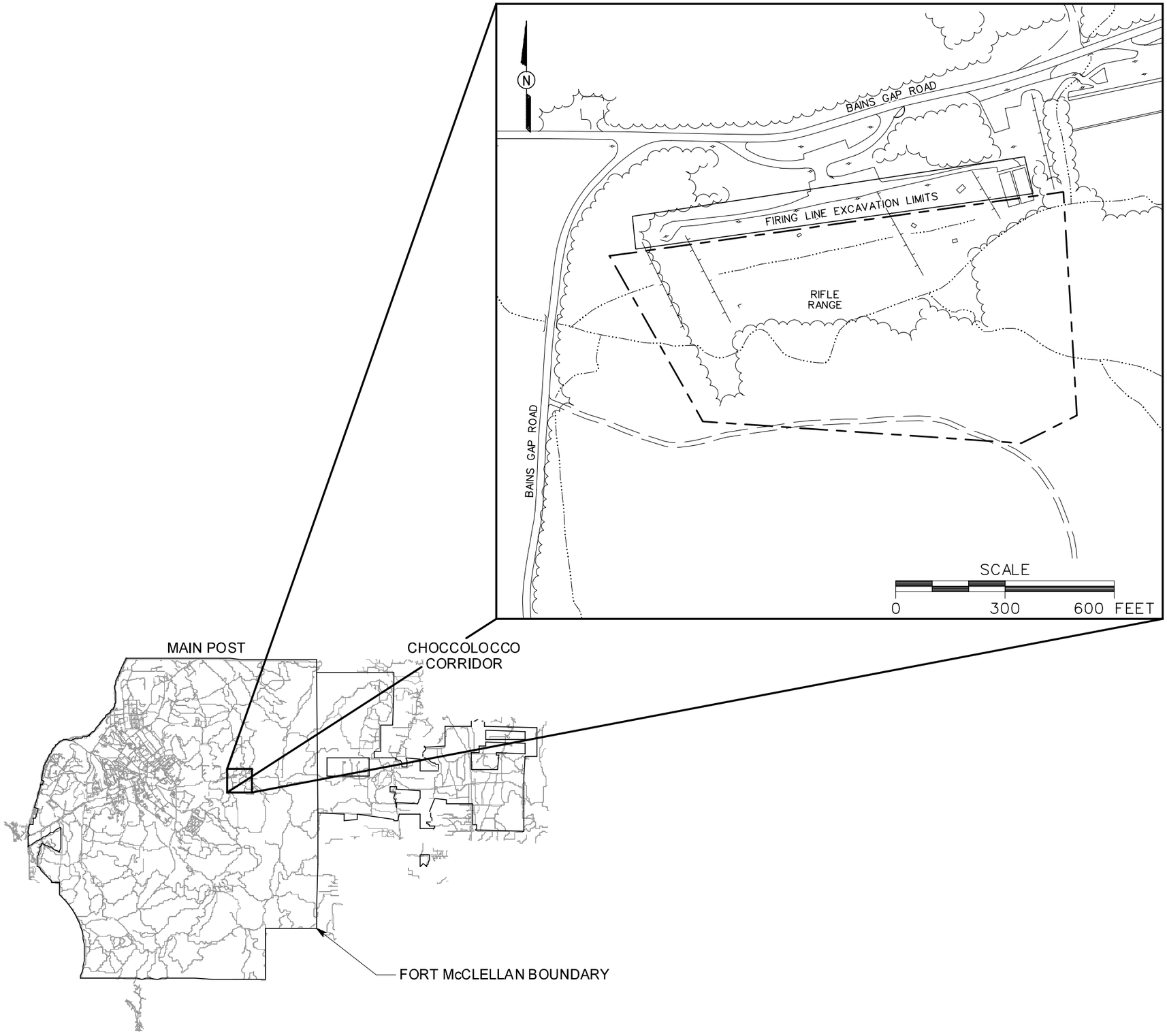
Range 27, Parcel 85(Q), was also known as the Stress Pistol and Shotgun Range. Refer to Figure 11-1 for the Range 27, Parcel 85(Q) location. Records are conflicting about the history of Range 27. The Archive Search Report states that the range "was built after World War II. It appears on the 1958 Range Map as Close Combat 1 & 2." The Environmental Baseline Survey (ESE, 1998) states that the range "has been in use from 1976 through the present. Ordnance fired at this range consisted of M-16 rifles (5.56-mm) between 1983 and 1989; and 9-mm pistol, 12-gauge shotgun, and .45-caliber pistol and machine gun from 1989 to present." Base Range Control Regulation 350-2 also indicates that a repelling tower and obstacle course were located here and that .38-caliber pistol ordnance was used. This range has historically been subdivided into four main areas:

- Range 27A – Shooting House
- Range 27B – Live Fire and Maneuver Close Quarters Battle Range
- Range 27C – Stress Pistol and Shotgun Range
- Range 27D – Pistol and Submachine Gun Qualification Range.

Range 27A is referred to as the "shooting house" or "tire house." This structure is constructed of stacks of old tires that have been staked upright using 4 inch by 4 inch wood posts. The tires are filled with sand to form the walls of the rooms. It has a gravel floor and no roof. The Army used the shooting house for training exercises with live ammunition. Wooden doors and interior divider walls within the house have sustained heavy damage from training. Bullets are present in the tires and wood.

Range 27B consists of a flat, open area between two berms. To the south, Cane Creek flows west. A tributary begins in this area and flows west to meet Cane Creek west of Range 27.

Range 27C is a large, flat, open area separated from Range 27B on the east and Range 27D on the west by soil berms. As indicated in the FTMC Range Control Regulation 350-2, this area may have once contained a repelling tower and obstacle course. There are no structures remaining.



LEGEND

- UNIMPROVED ROADS AND PARKING
- PAVED ROADS AND PARKING
- BUILDING
- TREES / TREELINE
- IMPACT ZONE
- BRIDGE
- CULVERT WITH HEADWALL
- SURFACE DRAINAGE / CREEK
- MANMADE SURFACE DRAINAGE FEATURE
- BERM
- UTILITY POLE

FIGURE 11-1
SITE LOCATION MAP
RANGE 27
PARCEL 85(Q)

U. S. ARMY CORPS OF ENGINEERS
MOBILE DISTRICT
FORT McCLELLAN
CALHOUN COUNTY, ALABAMA
Contract No. DACA21-96-D-0018

IT CORPORATION
A Member of The IT Group

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STARTING DATE: 07/03/01 DRAWN BY: D. BOMAR
DATE LAST REV.: DRAWN BY:
INITIATOR: J. BOND PROJ. MGR.: J. YACOUB ENGR. CHCK. BY: S. MORAN DRAFT. CHCK. BY:
DWG. NO.: ...\800486es.023 PROJ. NO.: 800486

Range 27D is a narrow range on the far western portion of Range 27. High concentrations of bullets have been observed along the base of the unnamed hill to the south of the range and within Cane Creek itself (both are within the impact area for this portion of the range.)

Because of the hilly terrain of this range, contamination is not expected to be found within the range fan; however, XRF samples will be collected at strategic locations within the range fan to address the potential for lead contamination.

11.2 Sample Locations and Rationale

The sampling locations and rationale are listed in Table 11-1. Proposed sampling locations are shown in Figure 11-2. Surface soil sample designations and QA/QC sample requirements are summarized in Table 11-2. Groundwater sample designations and QA/QC sample requirements are summarized in Table 11-3. The samples will be analyzed using EPA SW-846 methods, including Update III Methods where applicable, as presented in Table 11-4 of this SFSP and Table 6-1 in the QAP. The final sampling locations will be determined in the field by the on-site geologist, based on actual field conditions. Refer to Section 13.0 of this SFSP for a detailed discussion of the range sampling.

Table 11-1

Sampling Locations and Rationale
Range Sampling
Bains Gap Road
Range 27, Parcel 85(Q)
Fort McClellan, Calhoun County, Alabama

Sample Location	Sample Media	Sample Location Rationale
HR-85Q-MW01	Groundwater	Residuum monitoring well to be installed in the western portion of Range 27, adjacent to proposed bedrock monitoring well HR-85Q-MW02. The completed depth of the well is anticipated to be approximately 45 feet below ground surface (bgs). Sample data will indicate if contaminant releases into the environment have occurred from the use of this area and if contaminated media exist at this site. The monitoring well location will be used to establish a local groundwater flow direction, characterize site-specific geology, and provide information on groundwater quality in the residuum aquifer.
HR-85Q-MW02	Groundwater	Bedrock monitoring well to be installed in the western portion of Range 27, adjacent to proposed residuum monitoring well HR-85Q-MW01. The completed depth of the well is anticipated to be approximately 100 feet bgs. Sample data will indicate if contaminant releases into the environment have occurred from the use of this area and if contaminated media exist at this site. The monitoring well location will be used to establish a vertical hydraulic gradient, characterize site-specific geology, and provide information on groundwater quality in the bedrock aquifer.
HR-85Q-MW03	Groundwater	Residuum monitoring well to be installed on the eastern end of Range 27, adjacent to proposed bedrock monitoring well HR-85Q-MW04. The completed depth of the well is anticipated to be approximately 45 feet bgs. Sample data will indicate if contaminant releases into the environment have occurred from the use of this area and if contaminated media exist at this site. The monitoring well location will be used to establish a local groundwater flow direction, characterize site-specific geology, and provide information on groundwater quality in the residuum aquifer.
HR-85Q-MW04	Groundwater	Bedrock monitoring well to be installed in the western portion of Range 27, adjacent to proposed residuum monitoring well HR-85Q-MW03. The completed depth of the well is anticipated to be approximately 100 feet bgs. Sample data will indicate if contaminant releases into the environment have occurred from the use of this area and if contaminated media exist at this site. The monitoring well location will be used to establish a vertical hydraulic gradient, characterize site-specific geology, and provide information on groundwater quality in the bedrock aquifer.
HR-85Q-MW05	Groundwater	Residuum monitoring well to be installed in the central portion of Range 27. The completed depth of the well is anticipated to be 45 feet bgs. Sample data will indicate if contaminant releases into the environment have occurred from the use of this area and if contaminated media exist at this site. The monitoring well location will be used to establish a local groundwater flow direction, characterize site-specific geology, and provide information on groundwater quality in the residuum aquifer.
HR-85Q-SS01	Surface soil	Surface soil sample location to be collected near the Engineering Evaluation/Cost Analysis soil sample location (SS34) where a high concentration of lead was detected. Surface soil sample will be analyzed for a complete set of parameters to determine if Range 27 has been impacted with any additional contaminants (there is known lead contamination). Soil sample data will also be used to assess potential impacts to terrestrial biota that might utilize the site for food and/or habitat.
HR-85Q-SS02	Surface soil	Surface soil sample location to be collected near the Engineering Evaluation/Cost Analysis soil sample location (SS38) where a high concentration of lead was detected. Surface soil sample will be analyzed for a complete set of parameters to determine if Range 27 has been impacted with any additional contaminants (there is known lead contamination). Soil sample data will also be used to assess potential impacts to terrestrial biota that might utilize the site for food and/or habitat.

DRAFT. CHCK. BY:
ENGR. CHCK. BY: S. MORAN
INITIATOR: J. BOND
PROJ. MGR.: J. YACOUB
STARTING DATE: 07/03/01
DRAWN BY: D. BOMAR
DATE LAST REV.:
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BAINS GAP ROAD

FIRING LINE EXCAVATION LIMITS

RIFLE RANGE

CANE CREEK

HR-85Q-MW01

HR-85Q-MW02

HR-85Q-MW03

HR-85Q-MW04

HR-85Q-MW05

HR-85Q-SS01

HR-85Q-SS02

LEGEND

- UNIMPROVED ROADS AND PARKING
- PAVED ROADS AND PARKING
- BUILDING
- TOPOGRAPHIC CONTOURS (CONTOUR INTERVAL - 5 FOOT)
- TREES / TREELINE
- IMPACT ZONE
- BRIDGE
- CULVERT WITH HEADWALL
- SURFACE DRAINAGE / CREEK
- MANMADE SURFACE DRAINAGE FEATURE
- BERM
- UTILITY POLE
- PROPOSED BEDROCK MONITORING WELL LOCATION
- PROPOSED RESIDUUM MONITORING WELL LOCATION
- PROPOSED SURFACE SOIL SAMPLE LOCATION

SCALE

0 200 400 FEET

FIGURE 11-2
PROPOSED SAMPLE LOCATION MAP
RANGE 27
PARCEL 85(Q)

U. S. ARMY CORPS OF ENGINEERS
MOBILE DISTRICT
FORT McCLELLAN
CALHOUN COUNTY, ALABAMA
Contract No. DACA21-96-D-0018

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Table 11-2

Surface Soil Sample Designations and QA/QC Sample Quantities
Range Sampling
Bains Gap Road
Range 27
Parcel 85(Q)
Fort McClellan, Calhoun County, Alabama

Sample Location	Sample Designation	Sample Depth (ft)	QA/QC Samples			Analytical Suite
			Field Duplicates	Field Splits	MS/MSD	
HR-85Q-SS01	HR-85Q-SS01-SS-HSS0001-REG	0-1	HR-85Q-SS01-SS-HSS0002-FD		HR-85Q-SS01-SS-HSS0001-MS/MSD	TCL VOCs, TCL SVOCs, TAL Metals, Nitroexplosives, Perchlorate, Cyanide, OP & Cl Pest., Herbicides, and PCBs

Cl Pest. - Chlorinated Pesticides.
FD - Field duplicate.
MS/MSD - Matrix spike/matrix spike duplicate.
OP Pest. - Organophosphorous Pesticide.
PCB - Polychlorinated biphenyl.
QA/QC - Quality assurance/quality control.
REG - Field sample.
SVOC - Semivolatile organic compound.
TAL - Target analyte list.
TCL - Target compound list.
VOC - Volatile organic compound.

Table 11-3

Groundwater Sample Designations and QA/QC Sample Quantities
Range Sampling
Bains Gap Road
Range 27
Parcel 85(Q)
Fort McClellan, Calhoun County, Alabama

Sample Location	Sample Designation	Sample Matrix	QA/QC Samples			Analytical Suite
			Field Duplicates	Field Splits	MS/MSD	
HR-85Q-MW01	HR-85Q-MW01-GW-HSS3001-REG	Groundwater			HR-85Q-MW01-GW-HSS3001-MS/MSD	TCL VOCs, TCL SVOCs, TAL Metals, Nitroexplosives, and Perchlorate
HR-85Q-MW02	HR-85Q-MW02-GW-HSS3002-REG	Groundwater	HR-85Q-MW02-GW-HSS3003-FD			TCL VOCs, TCL SVOCs, TAL Metals, Nitroexplosives, and Perchlorate
HR-85Q-MW03	HR-85Q-MW03-GW-HSS3004-REG	Groundwater				TCL VOCs, TCL SVOCs, TAL Metals, Nitroexplosives, and Perchlorate
HR-85Q-MW04	HR-85Q-MW04-GW-HSS3005-REG	Groundwater				TCL VOCs, TCL SVOCs, TAL Metals, Nitroexplosives, and Perchlorate

FD - Field duplicate.
MS/MSD - Matrix spike/matrix spike duplicate.
QA/QC - Quality assurance/quality control.
REG - Field sample.
SVOC - Semivolatile organic compound.
TAL - Target analyte list.
TCL - Target compound list.
VOC - Volatile organic compound.

Table 11-4

Analytical Samples
Range Sampling
Bains Gap Road
Range 27
Parcel 85(Q)
Fort McClellan, Calhoun County, Alabama

Parameters	Analysis Method	Sample Matrix	TAT Needed	Field Samples: No. of Sample Points	Field Samples: No. of Events	Field Samples: No. of Field Samples	QA/QC Samples[a]: Field Dups (10%)	QA/QC Samples[a]: Splits w/ QA Lab (0%)	QA/QC Samples[a]: MS/MSD (5%)	QA/QC Samples[a]: Trip Blank (1/ship)	QA/QC Samples[a]: Eq. Rinse (1/wk/matrix)	EMAX: Total No. Analysis	QA Lab: Total No. Analysis
Bains Gap Road - Range 27, Parcel 85(Q): 4 water matrix samples (4 groundwater samples) and **1 soil matrix sample** (1 surface soil)													
TCL VOCs	8260B	water	normal	4	1	4	1		1	1	1	9	0
TCL SVOCs	8270C	water	normal	4	1	4	1		1	1	1	9	0
TAL Metals	6010B/7000	water	normal	4	1	4	1		1	1	1	9	0
Nitroexplosives	8330	water	normal	4	1	4	1		1	1	1	9	0
Perchlorate	314	water	normal	4	1	4	1		1	1	1	9	0
TCL VOCs	8260B/5035	soil	normal	1	1	1	1		1		1	5	0
TCL SVOCs	8270C	soil	normal	1	1	1	1		1		1	5	0
TAL Metals	6010B/7000	soil	normal	1	1	1	1		1		1	5	0
Nitroexplosives	8330	soil	normal	1	1	1	1		1		1	5	0
Cyanide	9012B	soil	normal	1	1	1	1		1		1	5	0
OP Pesticides	8141A	soil	normal	1	1	1	1		1		1	5	0
Cl Pesticides	8081A	soil	normal	1	1	1	1		1		1	5	0
Herbicides	8151A	soil	normal	1	1	1	1		1		1	5	0
Perchlorate	314	soil	normal	1	1	1	1		1		1	5	0
PCBs	8082	soil	normal	1	1	1	1		1		1	5	0
			Range 27 Subtotal:	24	9	0	9		5	9		65	0

[a]Field duplicate and MS/MSD samples were calculated as a percentage of the field samples collected per site and were rounded to the nearest whole number.
Trip blank samples will be collected in association with water matrix samples for VOC analysis only. Assumed four field samples per day to estimate trip blanks. Equipment blanks will be collected once per event whenever sampling equipment is field decontaminated and re-used. They will be repeated weekly for sampling events that are anticipated to last more than 1 week. Assumed 20 field samples will be collected per week to estimate number of equipment blanks.

Ship samples to: EMAX Laboratories, Inc
1835 205th Street
Torrance, CA 90501
Attn: Elizabeth McIntyre
Tel: 310-618-8889
Fax: 310-618-0818

ASTM - American Society for Testing and Materials.
Cl Pesticides - Chlorinated Pesticides.
Dups - Duplicates.
Eq. Rinse - Equipment rinse.
MS/MSD - Matrix spike/matrix spike duplicate.
OP Pesticides - Organophosphorous Pesticides.
PCB - Polychlorinated Biphenyl.
QA/QC - Quality assurance/quality control.
SVOC - Semivolatile organic compound.
TAL - Target analyte list.
TCL - Target compound list.
VOC - Volatile organic compound.

12.0 Bains Gap Road – Cane Creek Area

12.1 Site Description

Cane Creek flows from east to west through the impact zones of Ranges 21, 22, and 27. Cane Creek has several tributaries in this area. Two of the main tributaries flow north in the southern portions of Range 21 and 22. One meets Cane Creek at Range 22 and the other meets further west, just south of Range 27. Two of the other main tributaries flow south under Bains Gap Road, with one joining Cane Creek in the impact zone for Range 21 and the other joining Cane Creek further west, between Range 22 and Range 27. Surface water runoff follows topography and generally flows west towards Cane Creek at these three ranges. Cane Creek flows west towards the central area of the Main Post.

12.2 Sample Locations and Rationale

The surface water sampling rationale are listed in Table 12-1. The samples will be collected from the locations proposed on Figure 12-1. Surface water and sediment sample designations and QA/QC sample requirements are listed in Table 12-2. The samples will be analyzed using EPA SW-846 methods, including Update III Methods where applicable, as presented in Table 12-3 of this SFSP and Table 6-1 in the QAP. The exact sampling locations will be determined in the field by the ecological sampler, based on drainage pathways and actual field observations.

Table 12-1

Sampling Locations and Rationale
Range Sampling
Bains Gap Road
Cane Creek Area
Fort McClellan, Calhoun County, Alabama

Sample Location	Sample Media	Sample Location Rationale
HR-77Q-SW/SD01	Surface water and sediment	Sample location is in a tributary of Cane Creek that flows west across the Range 21, Parcel 77(Q). The sample will be collected from the same area where a previous sediment sample (SD24) was collected for the Engineering Evaluation/Cost Analysis. The previous sample (SD24) was analyzed for lead only and the results indicated an elevated concentration. The sample collected for this investigation (HR-77Q-SW/SD01) will be analyzed for a complete set of parameters to determine if the Cane Creek area has been impacted with any additional contaminants. Sample data will be used to assess potential impacts to aquatic biota in the creek and other ecological receptors that may use the creek for food or habitat purposes.
HR-78Q-SW/SD01	Surface water and sediment	Sample location is in Cane Creek, which flows west across Range 22, Parcel 78(Q). The sample will be collected from the same area where a previous surface water/sediment sample (SW/SD12) was collected for the Engineering Evaluation/Cost Analysis. The previous sample (SW/SD12) was analyzed for lead only and the results indicated an elevated concentration. The sample collected for this investigation (HR-78Q-SW/SD01) will be analyzed for a complete set of parameters to determine if the Cane Creek area has been impacted with any additional contaminants. Sample data will be used to assess potential impacts to aquatic biota in the creek and other ecological receptors that may use the creek for food or habitat purposes.
HR-85Q-SW/SD01	Surface water and sediment	Sample location is in Cane Creek, which flows west across Range 27, Parcel 85(Q). The sample will be collected from the same area where a previous surface water/sediment sample (SW/SD05) was collected for the Engineering Evaluation/Cost Analysis. The previous sample (SW/SD05) was analyzed for lead only and the results indicated an elevated concentration. The sample collected for this investigation (HR-85Q-SW/SD01) will be analyzed for a complete set of parameters to determine if the Cane Creek area has been impacted with any additional contaminants. Sample data will be used to assess potential impacts to aquatic biota in the creek and other ecological receptors that may use the creek for food or habitat purposes.
HR-85Q-SW/SD01	Surface water and sediment	Sample location is in a tributary of Cane Creek that flows west across Range 27, Parcel 85(Q). The sample will be collected from the same area where a previous surface water/sediment sample (SW/SD03) was collected for the Engineering Evaluation/Cost Analysis. The previous sample (SW/SD03) was analyzed for lead only and the results indicated an elevated concentration. The sample collected for this investigation (HR-85Q-SW/SD02) will be analyzed for a complete set of parameters to determine if the Cane Creek area has been impacted with any additional contaminants. Sample data will be used to assess potential impacts to aquatic biota in the creek and other ecological receptors that may use the creek for food or habitat purposes.

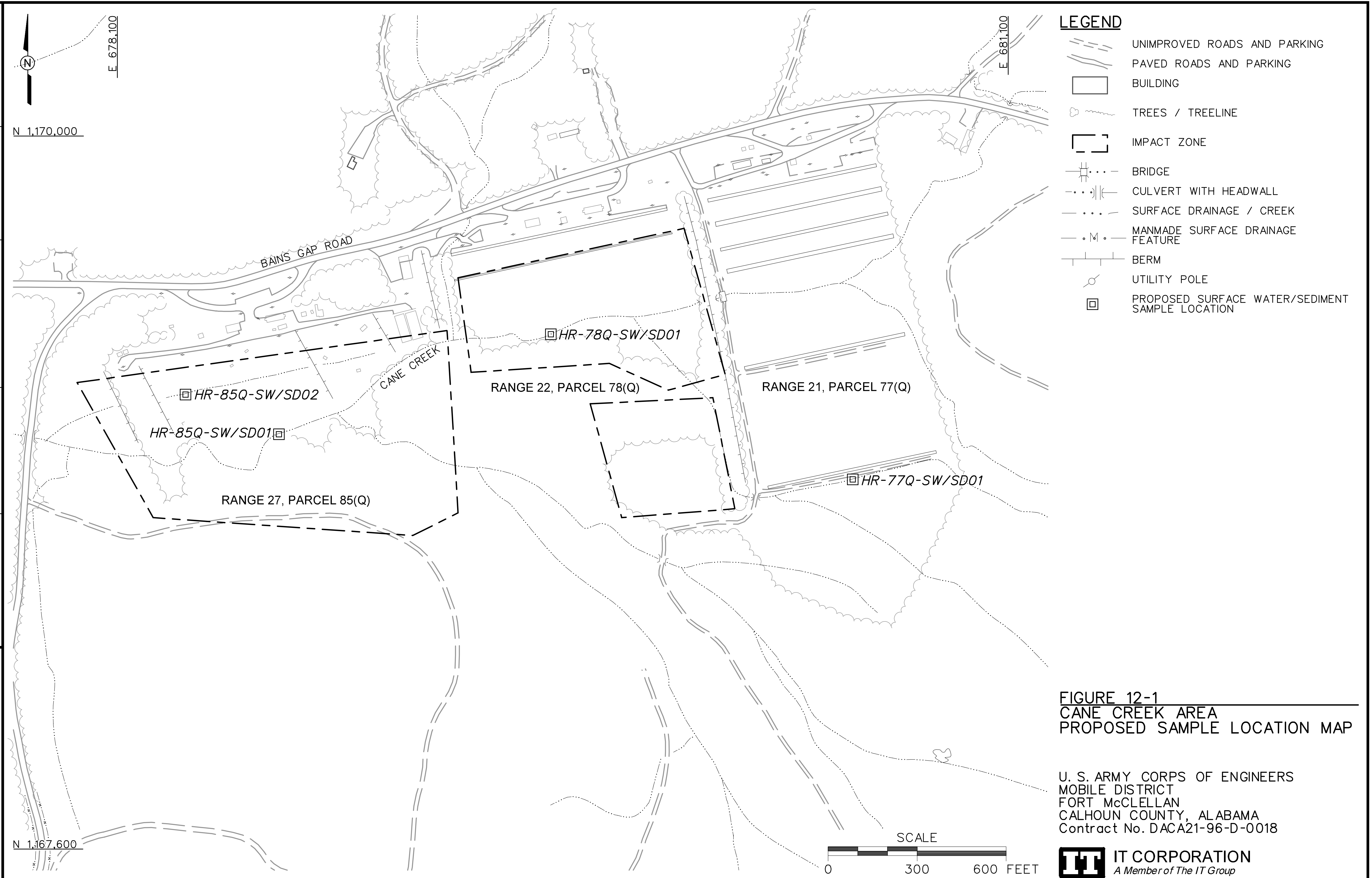

FIGURE 12-1
CANE CREEK AREA
PROPOSED SAMPLE LOCATION MAP

U. S. ARMY CORPS OF ENGINEERS
MOBILE DISTRICT
FORT McCLELLAN
CALHOUN COUNTY, ALABAMA
Contract No. DACA21-96-D-0018

IT CORPORATION
A Member of The IT Group

DWG. NO.: ...\800486es.027
PROJ. NO.: 800486
INITIATOR: J. BOND
PROJ. MGR.: J. YACOUB
DRAFT. CHCK. BY:
ENGR. CHCK. BY: S. MORAN
DATE LAST REV.:
DRAWN BY:
STARTING DATE: 07/10/01
DRAWN BY: D. BOMAR
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Table 12-2

Surface Water and Sediment Sample Designations and QA/QC Sample Quantities
Range Sampling
Bains Gap Road
Cane Creek Area
Fort McClellan, Calhoun County, Alabama

Sample Location	Sample Designation	Sample Depth (ft)	QA/QC Samples			Analytical Suite
			Field Duplicates	Field Splits	MS/MSD	
HR-77Q-SW/SD01	HR-77Q-SW/SD01-SW-HPP2001-REG	NA			HR-78Q-SW/SD01-SW-HQQ2001-MS/MSD	TCL VOCs, TCL SVOCs, TAL Metals, Nitroexplosives, Perchlorate, Cyanide, OP & Cl Pest., Herbicides, PCBs, TOC (sediment only), and Grain size (sediment only)
	HR-77Q-SW/SD01-SD-HPP1001-REG	0-0.5			HR-78Q-SW/SD01-SD-HQQ1001-MS/MSD	
HR-78Q-SW/SD01	HR-78Q-SW/SD01-SW-HQQ2001-REG	NA	HR-78Q-SW/SD01-SW-HQQ2002-FD			TCL VOCs, TCL SVOCs, TAL Metals, Nitroexplosives, Perchlorate, Cyanide, OP & Cl Pest., Herbicides, PCBs, TOC (sediment only), and Grain size (sediment only)
	HR-78Q-SW/SD01-SD-HQQ1001-REG	0-0.5	HR-78Q-SW/SD01-SD-HQQ1002-FD			
HR-85Q-SW/SD01	HR-85Q-SW/SD01-SW-HSS2001-REG	NA				TCL VOCs, TCL SVOCs, TAL Metals, Nitroexplosives, Perchlorate, Cyanide, OP & Cl Pest., Herbicides, PCBs, TOC (sediment only), and Grain size (sediment only)
	HR-85Q-SW/SD01-SD-HSS1001-REG	0-0.5				
HR-85Q-SW/SD02	HR-85Q-SW/SD02-SW-HSS2002-REG	NA				TCL VOCs, TCL SVOCs, TAL Metals, Nitroexplosives, Perchlorate, Cyanide, OP & Cl Pest., Herbicides, PCBs, TOC (sediment only), and Grain size (sediment only)
	HR-85Q-SW/SD02-SD-HSS1002-REG	0-0.5				

Cl Pest. - Chlorinated Pesticides.
FD - Field duplicate.
MS/MSD - Matrix spike/matrix spike duplicate.
NA - Not applicable.
OP Pest. - Organophosphorous Pesticide.
PCB - Polychlorinated biphenyl.
QA/QC - Quality assurance/quality control.
REG - Field sample.
SVOC - Semivolatile organic compound.
TAL - Target analyte list.
TCL - Target compound list.
TOC - Total organic carbon.
VOC - Volatile organic compound.

Table 12-3

Analytical Samples
Range Sampling
Iron Mountain Road
Remount Creek Area
Fort McClellan, Calhoun County, Alabama

Parameters	Analysis Method	Sample Matrix	TAT Needed	Field Samples: No. of Sample Points	No. of Events	No. of Field Samples	QA/QC Samples[a]: Field Dups (10%)	Splits w/ QA Lab (0%)	MS/MSD (5%)	Trip Blank (1/ship)	Eq. Rinse (1/wk/matrix)	EMAX Total No. Analysis	QA Lab Total No. Analysis
Bains Gap Road - Cane Creek Area: 4 water matrix samples (4 surface water) and **4 soil matrix samples** (4 sediment)													
TCL VOCs	8260B/5035	water	normal	4	1	4	1		1	1	1	9	0
TCL SVOCs	8270C	water	normal	4	1	4	1		1	1	1	9	0
TAL Metals	6010B/7000	water	normal	4	1	4	1		1	1	1	9	0
Nitroexplosives	8330	water	normal	4	1	4	1		1	1	1	9	0
Cyanide	9012B	water	normal	4	1	4	1		1	1	1	9	0
OP Pesticides	8141A	water	normal	4	1	4	1		1	1	1	9	0
Cl Pesticides	8081A	water	normal	4	1	4	1		1	1	1	9	0
Herbicides	8151A	water	normal	4	1	4	1		1	1	1	9	0
Perchlorate	314	water	normal	4	1	4	1		1	1	1	9	0
PCBs	8082	water	normal	4	1	4	1		1	1	1	9	0
TCL VOCs	8260B/5035	sediment	normal	4	1	4	1		1		1	8	0
TCL SVOCs	8270C	sediment	normal	4	1	4	1		1		1	8	0
TAL Metals	6010B/7000	sediment	normal	4	1	4	1		1		1	8	0
Nitroexplosives	8330	sediment	normal	4	1	4	1		1		1	8	0
Cyanide	9012B	sediment	normal	4	1	4	1		1		1	8	0
OP Pesticides	8141A	sediment	normal	4	1	4	1		1		1	8	0
Cl Pesticides	8081A	sediment	normal	4	1	4	1		1		1	8	0
Herbicides	8151A	sediment	normal	4	1	4	1		1		1	8	0
Perchlorate	314	sediment	normal	4	1	4	1		1		1	8	0
PCBs	8082	sediment	normal	4	1	4	1		1		1	8	0
TOC	9060	sediment	normal	4	1	4	1		1		1	8	0
Grain Size	ASTM 421/422	sediment	normal	4	1	4	1		1		1	8	0
Cane Creek Area Subtotal:				56	14	4	0		14	10	14	122	0

[a]Field duplicate and MS/MSD samples were calculated as a percentage of the field samples collected per site and were rounded to the nearest whole number.
Trip blank samples will be collected in association with water matrix samples for VOC analysis only. Assumed four field samples per day to estimate trip blanks. Equipment blanks will be collected once per event whenever sampling equipment is field decontaminated and re-used. They will be repeated weekly for sampling events that are anticipated to last more than 1 week. Assumed 20 field samples will be collected per week to estimate number of equipment blanks.

Ship samples to: EMAX Laboratories, Inc
1835 205th Street
Torrance, CA 90501
Attn: Elizabeth McIntyre
Tel: 310-618-8889
Fax: 310-618-0818

ASTM - American Society for Testing and Materials.
Cl Pesticides - Chlorinated Pesticides.
Dups - Duplicates.
Eq. Rinse - Equipment rinse.
MS/MSD - Matrix spike/matrix spike duplicate.
OP Pesticides - Organophosphorous Pesticides.
PCB - Polychlorinated Biphenyl.
QA/QC - Quality assurance/quality control.
SVOC - Semivolatile organic compound.
TAL - Target analyte list.
TCL - Target compound list.
TOC - Total organic carbon.
VOC - Volatile organic compound.

13.0 XRF Range Fan Sampling

13.1 Site Description

The Ranges at Iron Mountain Road and Bains Gap Road each have extensive range fans comprised of thousands of over-lapping acres of hilly terrain. The purpose of the range fans was to provide a safe area for ordnance that accidentally over-shot the main impact area of the ranges to land. XRF samples will be collected at strategic locations within the range fans to address the potential for lead contamination in surface soil. Refer to Figure 13-1 for a map of the range fans and proposed sampling locations for the Ranges at Iron Mountain Road. Refer to Figure 13-2 for a map of the range fans and proposed sampling locations for the Ranges at Bains Gap Road.

13.2 Sample Locations and Rationale

A total of 80 XRF samples (40 from each set of range fans) will be collected. The samples will be collected from the locations proposed on Figures 13-1 and 13-2. Tables 13-1 and 13-2 contain the approximate geographic coordinates for the proposed XRF sampling locations at the ranges at Iron Mountain Road and the ranges at Bains Gap Road, respectively. Confirmatory surface soil sample designations and QA/QC sample requirements are listed in Table 13-3. The confirmatory samples will be analyzed using EPA SW-846 methods, including Update III Methods where applicable, as presented in Table 13-4 of this SFSP and Table 6-1 in the QAP. The exact sampling locations will be determined in the field by the field geologist, based on terrain and actual field observations.

STARTING DATE: 07/06/01 | DATE LAST REV.: | DRAFT. CHCK. BY: | INITIATOR: J. BOND | DWG. NO.: ...\800486es.028
DRAWN BY: D. BOMAR | DRAWN BY: | ENGR. CHCK. BY: S. MORAN | PROJ. MGR.: J. YACOUB | PROJ. NO.: 800486

N

EGBERT HILL

SKEET RANGE PARCEL 69(Q)

HOWITZER HILL

IMR-XRF09

RANGE 19 PARCEL 75(Q)

IMR-XRF01

IMR-XRF05

SUNSET HILL

IMR-XRF18

IMR-XRF10

IMR-XRF24

IMR-XRF02

IMR-XRF06

IRON MOUNTAIN ROAD

RANGE 13 PARCEL 71(Q)

IMR-XRF19

IMR-XRF25

IMR-XRF31

IMR-XRF07

IMR-XRF03

IMR-XRF26

IMR-XRF32

IRON MOUNTAIN

IMR-XRF04

IMR-XRF22

IMR-XRF33

RANGE 12 PARCEL 70(Q)

IMR-XRF08

IMR-XRF27

IMR-XRF35

IMR-XRF11

IMR-XRF13

IMR-XRF20

IMR-XRF36

IMR-XRF37

BALTZELL HILL

RAMSEY HILL

JERRY HILL

IMR-XRF16

IMR-XRF17

IMR-XRF21

IMR-XRF29

IMR-XRF12

IMR-XRF14

IMR-XRF28

IMR-XRF34

IMR-XRF15

WHEELER HILL

IMR-XRF23

IMR-XRF38

IMR-XRF30

IMR-XRF39

FORD HILL

IMR-XRF40

CABLE HILL

GARDNER HILL

REYNOLDS HILL

PERRY HILL

LEGEND:

- UNIMPROVED ROADS AND PARKING
- PAVED ROADS AND PARKING
- BUILDING
- TOPOGRAPHIC ONTOURS (CONTOUR INTERVAL - 25 FOOT)
- PARCEL BOUNDARY
- SURFACE DRAINAGE / CREEK
- XRF SURFACE SOIL SAMPLE LOCATION

SCALE
0 1000 2000 FEET

FIGURE 13-1
PROPOSED XRF SAMPLE LOCATION MAP
IRON MOUNTAIN ROAD
RANGE FANS

U. S. ARMY CORPS OF ENGINEERS
MOBILE DISTRICT
FORT McCLELLAN
CALHOUN COUNTY, ALABAMA
Contract No. DACA21-96-D-0018

IT CORPORATION
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ENGR. CHCK. BY: S. MORAN
INITIATOR: J. BOND
PROJ. MGR.: J. YACOUB
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RANGE 22
PARCEL 78(Q)

RANGE 27
PARCEL 85(Q)

RANGE 21
PARCEL 77(Q)

JONES HILL

FREDERICH HILL

BAINS GAP ROAD

BAINS GAP

MARCHETA HILL

WIKOFF HILL

MORTON HILL

BGR-XRF01
BGR-XRF02
BGR-XRF03
BGR-XRF04
BGR-XRF05
BGR-XRF06
BGR-XRF07
BGR-XRF08
BGR-XRF09
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BGR-XRF11
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BGR-XRF34
BGR-XRF35
BGR-XRF36
BGR-XRF37
BGR-XRF38
BGR-XRF39
BGR-XRF40

LEGEND:

- UNIMPROVED ROADS AND PARKING
- PAVED ROADS AND PARKING
- BUILDING
- TOPOGRAPHIC CONTOURS (CONTOUR INTERVAL - 25 FOOT)
- PARCEL BOUNDARY
- SURFACE DRAINAGE / CREEK
- XRF SURFACE SOIL SAMPLE LOCATION

SCALE
0 1000 2000 FEET

FIGURE 13-2
PROPOSED XRF SAMPLE LOCATION MAP
BAINS GAP ROAD
RANGE FANS

U. S. ARMY CORPS OF ENGINEERS
MOBILE DISTRICT
FORT McCLELLAN
CALHOUN COUNTY, ALABAMA
Contract No. DACA21-96-D-0018

IT CORPORATION
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Table 13-1

Iron Mountain Road
Range Fan Sampling
Geographic Coordinates of Proposed XRF Sample Locations
Fort McClellan, Calhoun County, Alabama

SAMPLE LOCATION	NORTHING	EASTING
IMR-XRF01	1,164,595.32	666,064.42
IMR-XRF02	1,163,854.41	665,671.07
IMR-XRF03	1,162,589.88	665,921.41
IMR-XRF04	1,161,836.17	665,709.33
IMR-XRF05	1,164,690.86	667,262.40
IMR-XRF06	1,163,696.63	667,255.98
IMR-XRF07	1,162,749.90	667,326.49
IMR-XRF08	1,161,492.28	666,462.73
IMR-XRF09	1,165,313.05	669,647.61
IMR-XRF10	1,164,241.85	668,294.71
IMR-XRF11	1,161,140.54	666,998.50
IMR-XRF12	1,160,492.91	667,031.98
IMR-XRF13	1,161,079.13	668,929.49
IMR-XRF14	1,160,358.92	668,443.95
IMR-XRF15	1,159,800.61	668,427.21
IMR-XRF16	1,160,626.90	669,677.32
IMR-XRF17	1,160,645.12	670,656.50
IMR-XRF18	1,164,820.84	672,540.44
IMR-XRF19	1,163,307.06	672,040.31
IMR-XRF20	1,161,086.40	671,672.46
IMR-XRF21	1,160,650.93	671,990.57
IMR-XRF22	1,161,571.91	672,620.97
IMR-XRF23	1,159,595.73	672,219.39
IMR-XRF24	1,164,128.09	673,393.21
IMR-XRF25	1,163,416.32	673,399.87
IMR-XRF26	1,162,434.71	673,399.63
IMR-XRF27	1,161,427.87	673,354.98
IMR-XRF28	1,160,315.94	673,140.24
IMR-XRF29	1,160,633.96	673,946.42
IMR-XRF30	1,159,058.82	674,187.69
IMR-XRF31	1,163,166.58	674,399.24
IMR-XRF32	1,162,366.71	674,194.08
IMR-XRF33	1,161,596.99	674,392.85
IMR-XRF34	1,159,969.66	674,674.99
IMR-XRF35	1,161,207.63	676,765.26
IMR-XRF36	1,160,957.47	677,188.44
IMR-XRF37	1,160,771.46	678,259.22
IMR-XRF38	1,159,283.33	676,521.61
IMR-XRF39	1,159,013.92	677,515.45
IMR-XRF40	1,158,122.33	677,137.15

Horizontal coordinates referenced to the U.S. State Plane Coordinate System, Alabama East Zone, North American Datum of 1983 (NAD 83).

Table 13-2

Bains Gap Road
Range Fan Sampling
Geographic Coordinates of Proposed XRF Sample Locations
Fort McClellan, Calhoun County, Alabama

SAMPLE LOCATION	NORTHING	EASTING
BGR-XRF-01	1,168,403.63	678,176.30
BGR-XRF-02	1,167,804.05	678,981.58
BGR-XRF-03	1,168,277.56	679,676.22
BGR-XRF-04	1,168,130.03	680,797.51
BGR-XRF-05	1,168,924.94	682,057.75
BGR-XRF-06	1,168,246.48	682,654.97
BGR-XRF-07	1,168,929.46	683,657.73
BGR-XRF-08	1,166,096.65	679,113.68
BGR-XRF-09	1,166,299.18	680,399.22
BGR-XRF-10	1,167,451.57	683,166.15
BGR-XRF-11	1,168,076.80	684,772.66
BGR-XRF-12	1,164,932.13	680,424.53
BGR-XRF-13	1,165,379.46	682,572.25
BGR-XRF-14	1,166,832.01	685,890.05
BGR-XRF-15	1,163,467.52	679,881.29
BGR-XRF-16	1,163,964.23	681,633.09
BGR-XRF-17	1,164,355.24	683,365.91
BGR-XRF-18	1,162,289.74	680,832.89
BGR-XRF-19	1,162,939.36	683,260.09
BGR-XRF-20	1,164,070.74	684,860.62
BGR-XRF-21	1,165,260.78	685,470.92
BGR-XRF-22	1,165,825.71	686,816.55
BGR-XRF-23	1,161,534.78	678,779.23
BGR-XRF-24	1,160,113.47	678,628.74
BGR-XRF-25	1,160,529.68	679,474.12
BGR-XRF-26	1,160,379.14	680,597.01
BGR-XRF-27	1,160,861.76	681,149.38
BGR-XRF-28	1,160,127.86	682,560.18
BGR-XRF-29	1,161,759.13	684,979.10
BGR-XRF-30	1,159,876.76	684,087.67
BGR-XRF-31	1,158,563.90	683,684.15
BGR-XRF-32	1,160,730.10	686,096.06
BGR-XRF-33	1,160,465.04	686,719.48
BGR-XRF-34	1,161,428.64	688,846.68
BGR-XRF-35	1,164,581.14	687,740.52
BGR-XRF-36	1,163,813.79	686,980.79
BGR-XRF-37	1,163,454.87	686,536.43
BGR-XRF-38	1,163,132.18	687,036.74
BGR-XRF-39	1,163,684.38	688,927.74
BGR-XRF-40	1,162,902.98	690,150.97

Horizontal coordinates referenced to the U.S. State Plane Coordinate System, Alabama East Zone, North American Datum of 1983 (NAD 83).

Table 13-3

XRF Confirmatory Surface Soil Sample Designations and QA/QC Sample Quantities
Range Fan Sampling
Iron Mountain Road and Bains Gap Road Range Fans
Fort McClellan, Calhoun County, Alabama

Sample Location	Sample Designation	Sample Depth (ft)	QA/QC Samples			Analytical Suite
			Field Duplicates	Field Splits	MS/MSD	
IMR-XRF01	IMR-XRF01-SS-NC0001-REG	0-1			IMR-XRF01-SS-NC0001-MS/MSD	Lead
IMR-XRF02	IMR-XRF02-SS-NC0002-REG	0-1	IMR-XRF02-SS-NC0003-REG			Lead
IMR-XRF03	IMR-XRF03-SS-NC0004-REG	0-1				Lead
IMR-XRF04	IMR-XRF04-SS-NC0005-REG	0-1				Lead
BGR-XRF01	BGR-XRF01-SS-NE0001-REG	0-1			BGR-XRF01-SS-NE0001-MS/MSD	Lead
BGR-XRF02	BGR-XRF02-SS-NE0002-REG	0-1	BGR-XRF02-SS-NE0003-MS/MSD			Lead
BGR-XRF03	BGR-XRF03-SS-NE0004-REG	0-1				Lead
BGR-XRF04	BGR-XRF04-SS-NE0005-REG	0-1				Lead

FD - Field duplicate.
ft - Feet.
MS/MSD - Matrix spike/matrix spike duplicate.
QA/QC - Quality assurance/quality control.
REG - Field sample.

Table 13-4

XRF Confirmatory Surface Soil Analytical Samples
Range Fan Sampling
Iron Mountain Road and Bains Gap Road Ranges
Fort McClellan, Calhoun County, Alabama

Parameters	Analysis Method	Sample Matrix	TAT Needed	Field Samples: No. of Sample Points	Field Samples: No. of Events	Field Samples: No. of Field Samples	QA/QC Samples[a]: Field Dups (10%)	QA/QC Samples[a]: Splits w/ QA Lab (0%)	QA/QC Samples[a]: MS/MSD (5%)	QA/QC Samples[a]: Trip Blank (1/ship)	QA/QC Samples[a]: Eq. Rinse (1/wk/matrix)	EMAX Total No. Analysis	QA Lab Total No. Analysis
Range Fan Confirmatory Sampling: 4 surface soil matrix samples (Iron Mountain Road) and 4 **surface soil matrix samples** (Bains Gap Road)													
Lead	6010B	soil	normal	8	1	8	1		1	1	1	13	0
Range Fan Confirmatory Sampling Subtotal:				8	1	0	1		1	1	1	13	0

[a]Field duplicate and MS/MSD samples were calculated as a percentage of the field samples collected per site and were rounded to the nearest whole number.
Trip blank samples will be collected in association with water matrix samples for VOC analysis only. Assumed four field samples per day to estimate trip blanks. Equipment blanks will be collected once per event whenever sampling equipment is field decontaminated and re-used. They will be repeated weekly for sampling events that are anticipated to last more than 1 week. Assumed 20 field samples will be collected per week to estimate number of equipment blanks.

Ship samples to: EMAX Laboratories, Inc
1835 205th Street
Torrance, CA 90501
Attn: Elizabeth McIntyre
Tel: 310-618-8889
Fax: 310-618-0818

ASTM - American Society for Testing and Materials.
Dups - Duplicates
Eq. Rinse - Equipment rinse
MS/MSD - Matrix spike/matrix spike duplicate.
QA/QC - Quality assurance/quality control.

14.0 Project Schedule

The project schedule for the range sampling activities will be provided by the IT project manager to the Base Realignment and Closure Cleanup Team and will be in accordance with the WP.

15.0 References

Environmental Science and Engineering, Inc. (ESE), 1998, ***Final Environmental Baseline Survey, Fort McClellan, Alabama***, prepared for U.S. Army Environmental Center, Aberdeen Proving Ground, Maryland, January.

Fort McClellan (FTMC), 1997, ***Fort McClellan Comprehensive Reuse Plan***, Fort McClellan Reuse and Redevelopment Authority of Alabama, prepared under contract to the Calhoun County Commission, November.

Fort McClellan (FTMC), 1991, Regulation Number 350-2.

IT Corporation (IT), 2001, Memorandum from Steve Moran to Ronald Levy, January 18.

IT Corporation (IT), 2000a, ***Final Installation-Wide Sampling and Analysis Plan, Fort McClellan, Calhoun County, Alabama***, August.

IT Corporation (IT), 2000b, ***Final Human Health and Ecological Screening Values and PAH Background Summary Report***, July.

IT Corporation (IT), 1998, ***Final Installation-Wide Work Plan, Fort McClellan, Calhoun County, Alabama***, August.

U.S. Army Corps of Engineers (USACE)-Huntsville Center, 2001, Memorandum from Daniel Copeland, January 23.

U.S. Army Corps of Engineers (USACE), 1999, ***Statement of Work for Task Order CK10, Remedial Investigations (RIs) at the Chemical Warfare Material Sites, RIs at the Fuel/Training Areas, RIs at the Print Plants/Motor Pools, RIs at the Ground Scars/Boiler Plants, RI at Range 24A, Site Investigations (SIs) at the Historic Ranges, and a Groundwater Investigation at Rideout Field at Fort McClellan, Alabama,*** June.

U.S. Army Corps of Engineers, St. Louis District (USACE), 1996. ***Draft Archives Search Report: Ordinance, Ammunition and Explosives, Report Summary; Fort McClellan, Main Post.***

U.S. Army Corps of Engineers (USACE), 1994, ***Requirements for the Preparation of Sampling and Analysis Plan***, Engineer Manual EM 200-1-3, September 1.

U.S. Department of Agriculture (USDA), 1961, ***Soil Survey, Calhoun County, Alabama***, Soil Conservation Service, Series 1958, No. 9, September 1961.

U.S. Environmental Protection Agency (EPA), 1993, ***Data Quality Objectives Process for Superfund, Interim Final Guidance***, EPA 540-R-93-071, September.

ATTACHMENT 1

LIST OF ABBREVIATIONS AND ACRONYMS

List of Abbreviations and Acronyms

2,4-D	2,4-dichlorophenoxyacetic acid
2,4,5-T	2,4,5-trichlorophenoxyacetic acid
2,4,5-TP	silvex
3D	3D International Environmental Group
Abs	skin absorption
AC	hydrogen cyanide
AcB2	Anniston and Allen gravelly loams, 2 to 6 percent slopes, eroded
AcC2	Anniston and Allen gravelly loams, 6 to 10 percent slopes, eroded
AcD2	Anniston and Allen gravelly loams, 10 to 15 percent slopes, eroded
AcE2	Anniston and Allen gravelly loams, 15 to 25 percent slopes, eroded
ACGIH	American Conference of Governmental Industrial Hygienists
ADEM	Alabama Department of Environmental Management
AEL	airborne exposure limit
AHA	ammunition holding area
AL	Alabama
amb.	amber
ANAD	Anniston Army Depot
APT	armor-piercing tracer
ARAR	applicable or relevant and appropriate requirement
ASP	ammunition supply point
ASR	Archives Search Report
AST	aboveground storage tank
ASTM	American Society for Testing and Materials
AWWSB	Anniston Water Works and Sewer Board
‘B’	Analyte detected in laboratory or field blank at concentration greater than the reporting limit (and greater than zero)
BCT	BRAC Cleanup Team
BEHP	bis(2-ethylhexyl)phthalate
BFB	bromofluorobenzene
BG	Bacillus globigii
bgs	below ground surface
BHC	betahexachlorocyclohexane
bkg	background
bls	below land surface
BOD	biological oxygen demand
BRAC	Base Realignment and Closure
Braun	Braun Intertec Corporation
BTAG	Biological Technical Assistance Group
BTEX	benzene, toluene, ethyl benzene, and xylenes
BTOC	below top of casing
BW	biological warfare
BZ	breathing zone; 3-quinuclidinyl benzilate
C	ceiling limit value
Ca	carcinogen
CCAL	continuing calibration
CCB	continuing calibration blank
CD	compact disc
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
CERFA	Community Environmental Response Facilitation Act
CESAS	Corps of Engineers South Atlantic Savannah
CG	carbonyl chloride (phosgene)
CFC	chlorofluorocarbon
ch	inorganic clays of high plasticity
CHPPM	U.S. Army Center for Health Promotion and Preventive Medicine
CK	cyanogen chloride
cl	inorganic clays of low to medium plasticity
Cl.	chlorinated
CLP	Contract Laboratory Program
CN	chloroacetophenone
CNB	chloroacetophenone, benzene, and carbon tetrachloride
CNS	chloroacetophenone, chloropicrin, and chloroform
Co-60	cobalt-60
COC	chain of custody; contaminant of concern
COE	Corps of Engineers
Con	skin or eye contact
COPC	contaminant of potential concern
COPEC	contaminant of potential environmental concern
CRL	certified reporting limit
CRZ	contamination reduction zone
Cs-137	cesium-137
CS	ortho-chlorobenzylidene-malononitrile
CSEM	conceptual site exposure model
ctr.	container
CWA	chemical warfare agent
CWM	chemical warfare material; clear, wide mouth
CX	dichloroformoxime
D	duplicate; dilution
DANC	decontamination agent, non-corrosive
ºC	degrees Celsius
ºF	degrees Fahrenheit
DCE	dichloroethene
DDD	dichlorodiphenyldichloroethane
DDE	dichlorodiphenyldichloroethene
DDT	dichlorodiphenyltrichloroethane
DEH	Directorate of Engineering and Housing
DEP	depositional soil
DI	deionized
DIMP	di-isopropylmethylphosphonate
DMMP	dimethylmethylphosphonate
DOD	U.S. Department of Defense
DOT	Department of Transportation
DP	direct-push
DPDO	Defense Property Disposal Office
DPT	direct-push technology
DQO	data quality objective
DRMO	Defense Reutilization and Marketing Office
DRO	diesel range organics
DS	deep (subsurface) soil
DS2	Decontamination Solution Number 2
DWEL	drinking water equivalent level
E&E	Ecology and Environment, Inc.
EBS	environmental baseline survey
EE/CA	engineering evaluation and cost analysis
Elev.	elevation
EM	electromagnetic
EM31	Geonics Limited EM31 Terrain Conductivity Meter
EM61	Geonics Limited EM61 High-Resolution Metal Detector
EOD	explosive ordnance disposal
EODT	explosive ordnance disposal team
EPA	U.S. Environmental Protection Agency
EPC	exposure point concentration
EPIC	Environmental Photographic Interpretation Center
ER	equipment rinsate
ESE	Environmental Science and Engineering, Inc.
ESV	ecological screening value
Exp.	explosives
E-W	east to west
EZ	exclusion zone
FAR	Federal Acquisition Regulations
FB	field blank
FD	field duplicate
FedEx	Federal Express, Inc.
FFE	field flame expedient
Fil	filtered
Flt	filtered
FMP 1300	Former Motor Pool 1300
Foster Wheeler	Foster Wheeler Environmental Corporation
Frtn	fraction
FS	field split; feasibility study
ft	feet
ft/ft	feet per foot
FTA	Fire Training Area
FTMC	Fort McClellan
g	gram
G-856	Geometrics, Inc. G-856 magnetometer
G-858G	Geometrics, Inc. G-858G magnetic gradiometer
gal	gallon
gal/min	gallons per minute
GB	sarin
gc	clay gravels; gravel-sand-clay mixtures
GC	gas chromatograph
GC/MS	gas chromatograph/mass spectrometer
GFAA	graphite furnace atomic absorption
GIS	Geographic Information System

gm	silty gravels; gravel-sand-silt mixtures
gp	poorly graded gravels; gravel-sand mixtures
gpm	gallons per minute
GPR	ground-penetrating radar
GPS	global positioning system
GS	ground scar
GSA	General Services Administration
GSBP	Ground Scar Boiler Plant
GSSI	Geophysical Survey Systems, Inc.
GST	ground stain
GW	groundwater
gw	well-graded gravels; gravel-sand mixtures
HA	hand auger
HCl	hydrochloric acid
HD	distilled mustard
HDPE	high-density polyethylene
Herb.	herbicides
HNO_3	nitric acid
hr	hour
H&S	health and safety
HSA	hollow-stem auger
HTRW	hazardous, toxic, and radioactive waste
'I'	out of control, data rejected due to low recovery
ICAL	initial calibration
ICB	initial calibration blank
ICP	inductively-coupled plasma
ICS	interference check sample
ID	inside diameter
IDL	instrument detection limit
IDLH	immediately dangerous to life or health
IDM	investigative derived media
IDW	investigation-derived waste
IMPA	isopropylmethyl phosphonic acid
IMR	Iron Mountain Road
in.	inch
Ing	ingestion
Inh	inhalation
IP	ionization potential
IPS	International Pipe Standard
IRDMIS	Installation Restoration Data Management Information System
ISCP	Installation Spill Contingency Plan
IT	IT Corporation
ITEMS	IT Environmental Management System ™
'J'	estimated concentration
JeB2	Jefferson gravelly fine sandy loam, 2 to 6 percent slopes, eroded
JeC2	Jefferson gravelly fine sandy loam, 6 to 10 percent slopes, eroded
JfB	Jefferson stony fine sandy loam, 0 to 10 percent slopes have strong slopes
K	conductivity
L	lewisite; liter
LC_{50}	lethal concentration for 50 percent of population tested
LD_{50}	lethal dose for 50 percent of population tested
l	liter
LCS	laboratory control sample
LEL	lower explosive limit
LOAEL	lowest-observed-adverse-effects-level
LT	less than the certified reporting limit
max	maximum
MCL	maximum contaminant level
MDL	method detection limit
mg/kg	milligrams per kilogram
mg/L	milligrams per liter
mg/m^3	milligrams per cubic meter
mh	inorganic silts, micaceous or diatomaceous fine, sandy or silt soils
MHz	megahertz
µg/g	micrograms per gram
µg/kg	micrograms per kilogram
µg/L	micrograms per liter
µmhos/cm	micromhos per centimeter
min	minimum
MINICAMS	miniature continuous air sampling system
ml	inorganic silts and very fine sands
mL	milliliter
mm	millimeter
MM	mounded material
MOGAS	motor vehicle gasoline
MPA	methyl phosphonic acid
MR	molasses residue
MS	matrix spike
mS/cm	millisiemens per centimeter
MSD	matrix spike duplicate
MTBE	methyl tertiary butyl ether
msl	mean sea level
MtD3	Montevallo shaly, silty clay loam, 10 to 40 percent slopes , severely eroded
mV	millivolts
MW	monitoring well
N/A	not applicable; not available
NAD	North American Datum
NAD83	North American Datum of 1983
NAVD88	North American Vertical Datum of 1988
NCP	National Contingency Plan
ND	not detected
NE	no evidence; northeast
NFA	No Further Action
ng/L	nanograms per liter
NGVD	National Geodetic Vertical Datum
NIC	notice of intended change
NIOSH	National Institute for Occupational Safety and Health
No.	number
NOAA	National Oceanic and Atmospheric Administration
NOAEL	no-observed-adverse-effects-level
NR	not requested; not recorded
ns	nanosecond
N-S	north to south
NS	not surveyed
nT	nanotesla
NTU	nephelometric turbidity unit
O&G	oil and grease
OD	outside diameter
OE	ordnance and explosives
oh	organic clays of medium to high plasticity
ol	organic silts and organic silty clays of low plasticity
OP	organophosphorus
ORP	oxidation-reduction potential
OSHA	Occupational Safety and Health Administration
OWS	oil/water separator
oz	ounce
PAH	polynuclear aromatic hydrocarbon
Parsons	Parsons Engineering Science, Inc.
Pb	lead
PCB	polychlorinated biphenyl
PCE	perchloroethene
PCP	pentachlorophenol
PDS	Personnel Decontamination Station
PEL	permissible exposure limit
Pest.	pesticide
PG	professional geologist
PID	photoionization detector
PkA	Philo and Stendal soils local alluvium, 0 to 2 percent slopes
POL	petroleum, oils, and lubricants
PP	peristaltic pump
ppb	parts per billion
PPE	personal protective equipment
ppm	parts per million
PPMP	Print Plant Motor Pool
ppt	parts per thousand
PRG	preliminary remediation goals
PSSC	potential site-specific chemical
pt	peat or other highly organic silts
PVC	polyvinyl chloride
QA	quality assurance
QA/QC	quality assurance/quality control
QAP	installation-wide quality assurance plan
QC	quality control
QST	QST Environmental Inc.

qty	quantity
Qual	qualifier
'R'	rejected; resample
RAO	removal action objective
RBC	EPA Region III Risk Based Concentration
RCRA	Resource Conservation and Recovery Act
RDX	cyclonite
ReB3	Rarden silty clay loams
REG	field sample
REL	recommended exposure limit
RFA	request for analysis
RI	remedial investigation
RL	reporting limit
RPD	relative percent difference
RRF	relative response factor
RSD	relative standard deviation
RTK	real-time kinematic
SAD	South Atlantic Division
SAE	Society of Automotive Engineers
SAIC	Science Applications International Corporation
SAP	installation-wide sampling and analysis plan
sc	clayey sands; sand-clay mixtures
Sch.	schedule
SD	sediment
SDG	sample delivery group
SDZ	safe distance zone; surface danger zone
SEMS	Southern Environmental Management & Specialties, Inc.
SFSP	site-specific field sampling plan
SGF	standard grade fuels
SHP	installation-wide safety and health plan
SI	site investigation
SL	standing liquid
sm	silty sands; sand-silt mixtures
SM	Serratia marcescens
SOP	standard operating procedure
sp	poorly graded sands; gravelly sands
SP	sump pump
Sr-90	strontium-90
Ss	stony rough land, sandstone series
SS	surface soil
SSC	site-specific chemical
SSHO	site safety and health officer
SSHP	site-specific safety and health plan
SSSL	site-specific screening level
STB	supertropical bleach
STEL	short-term exposure limit
STOLS	Surface Towed Ordnance Locator System®
Std. units	standard units
SU	standard unit
SVOC	semivolatile organic compound
SW	surface water
SW-846	U.S. EPA *Test Methods for Evaluating Solid Waste: Physical/Chemical Methods*
SZ	support zone
TAL	target analyte list
TAT	turn around time
TB	trip blank
TCA	trichloroethane
TCDD	2,3,7,8-tetrachlorodibenzo-p-dioxin
TCDF	tetrachlorodibenzofurans
TCE	trichloroethene
TCL	target compound list
TCLP	toxicity characteristic leaching procedure
TDGCL	thiodiglycol
TDGCLA	thiodiglycol chloroacetic acid
TERC	Total Environmental Restoration Contract
TIC	tentatively identified compound
TLV	threshold limit value
TN	Tennessee
TOC	top of casing; total organic carbon
TPH	total petroleum hydrocarbons
TRADOC	U.S. Army Training and Doctrine Command
TRPH	total recoverable petroleum hydrocarbons
TWA	time weighted average
UCL	upper confidence limit
UCR	upper certified range
'U'	not detected above reporting limit
USACE	U.S. Army Corps of Engineers
USACHPPM	U.S. Army Center for Health Promotion and Preventive Medicine
USAEC	U.S. Army Environmental Center
USAEHA	U.S. Army Environmental Hygiene Agency
USACMLS	U.S. Army Chemical School
USAMPS	U.S. Army Military Police School
USATEU	U.S. Army Technical Escort Unit
USATHAMA	U.S. Army Toxic and Hazardous Material Agency
USCS	Unified Soil Classification System
USDA	U.S. Department of Agriculture
USEPA	U.S. Environmental Protection Agency
UST	underground storage tank
UXO	unexploded ordnance
VOA	volatile organic analyte
VOC	volatile organic compound
VOH	volatile organic hydrocarbon
VQlfr	validation qualifier
VQual	validation qualifier
VX	nerve agent (O-ethyl-S-[diisopropylaminoethyl]-methylphosphonothiolate)
Weston	Roy F. Weston, Inc.
WP	installation-wide work plan
WS	watershed
WSA	Watershed Screening Assessment
WWI	World War I
WWII	World War II
XRF	x-ray fluorescence
yd^3	cubic yards

SAIC – Data Qualifiers, Codes and Footnotes, 1995 Remedial Investigation

N/A – Not analyzed

ND – Not detected

Boolean Codes

- LT – Less than the certified reporting limit

Flagging Codes

- 9 – Non-demonstrated/validated method performed for USAEC
- B – Analyte found in the method blank or QC blank
- C – Analysis was confirmed
- D – Duplicate analysis
- I – Interfaces in sample make quantitation and/or identification to be suspicious
- J – Value is estimated
- K – Reported results are affected by interfaces or high background
- N – Tentatively identified compound (match greater than 70%)
- Q – Sample interference obscured peak of interest
- R – Non-target compound analyzed for but not detected (GC/MS methods)
- S – Non-target compound analyzed for and detected (GC/MS methods)
- T – Non-target compound analyzed for but not detected (non GC/MS methods)
- U – Analysis in unconfirmed
- Z – Non-target compound analyzed for and detected (non-GC/MS methods)

Qualifiers

- J – The low-spike recovery is low
- N – The high-spike recovery is low
- R – Data is rejected